



Ecology of the mule deer associated with the Brackett Creek winter range in the Bridger Mountains, Montana

by Alfred Ivan Rosgaard, Jr

A thesis submitted in partial fulfillment of the requirements for the degree of MASTER OF SCIENCE in Fish and Wildlife Management

Montana State University

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Abstract:

This study was conducted from June 1979 to December 1980 in the Bridger Mountains of southwestern Montana. The objectives were to describe vegetational characteristics of the Brackett Creek winter range and to monitor the movements, distribution, habitat use, and population characteristics of mule deer associated with that winter range. Grasslands, big sagebrush, agricultural, and skunkbush-limber pine-juniper vegetation cover types comprised 42%, 24.5%, 17.5%, and 5.8% of the Brackett Creek winter range, respectively. Total current annual growth twig production of big sagebrush, antelope bitterbrush, and skunkbush sumac was determined to be 1,124,907 kg on 3 grass and 8 shrub dominated cover types. Those 3 species made up 96%, 1.9%, and 1.7%, respectively. Mule deer were widely distributed on the winter range throughout the winter of 1979-80. Mean winter home range size for 11 radio-collared deer was 3.06 km². Big sagebrush, skunkbush-limber pine-juniper, grassland, and agricultural vegetation types accounted for 51%, 16%, 15%, and 11% of the winter habitat use by marked deer. During summer, deer were distributed throughout the herd range in 3 segments. One segment was resident on the winter range.

The other 2 segments were migratory and included 1 group that used open habitats on the periphery of the winter range and another that moved to forested habitats at higher elevations. Summer home range sizes of radio-collared does averaged 3.7 and 3.1 km² for 1979 and 1980, respectively. Mule deer using the open shrub and grassland types had larger home ranges (7.6 km²) than those that inhabited forested habitats (2.1 km²). Douglas fir, big sagebrush, and swale cover types received, respectively, 47%, 21%, and 14% of the total summer-fall habitat use. Total population estimates of 2,105 and 2,010 were calculated for early and late winter 1979-80, respectively. Adult females, fawns, and adult males comprised 61%, 43%, and 4%, respectively, of the early winter population. Fawn production was 1.56 and 1.64 per radio-collared doe for 1979 and 1980, respectively. Overwinter mortality was low for the 1979-80 winter. Fawn:adult ratios decreased from 76 to 65 fawns/100 adults from early to late winter, representing an estimated loss of only 140 fawns. A minimum of 33 deer in 1979 and 66 in 1980 were killed during the fall hunting seasons. The Brackett Creek mule deer population may be stabilized at about 2,000-2,300 deer without apparent winter range browse deterioration or excessive hunting mortality, and despite high fawn production and survival.

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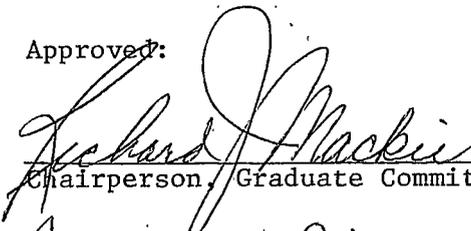
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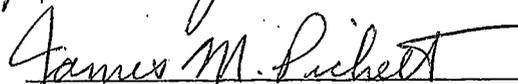
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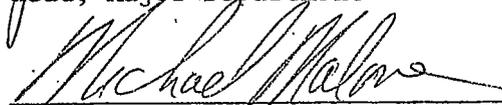
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ABSTRACT

This study was conducted from June 1979 to December 1980 in the Bridger Mountains of southwestern Montana. The objectives were to describe vegetational characteristics of the Brackett Creek winter range and to monitor the movements, distribution, habitat use, and population characteristics of mule deer associated with that winter range. Grasslands, big sagebrush, agricultural, and skunkbush-limber pine-juniper vegetation cover types comprised 42%, 24.5%, 17.5%, and 5.8% of the Brackett Creek winter range, respectively. Total current annual growth twig production of big sagebrush, antelope bitterbrush, and skunkbush sumac was determined to be 1,124,907 kg on 3 grass and 8 shrub dominated cover types. Those 3 species made up 96%, 1.9%, and 1.7%, respectively. Mule deer were widely distributed on the winter range throughout the winter of 1979-80. Mean winter home range size for 11 radio-collared deer was 3.06 km². Big sagebrush, skunkbush-limber pine-juniper, grassland, and agricultural vegetation types accounted for 51%, 16%, 15%, and 11% of the winter habitat use by marked deer. During summer, deer were distributed throughout the herd range in 3 segments. One segment was resident on the winter range. The other 2 segments were migratory and included 1 group that used open habitats on the periphery of the winter range and another that moved to forested habitats at higher elevations. Summer home range sizes of radio-collared does averaged 3.7 and 3.1 km² for 1979 and 1980, respectively. Mule deer using the open shrub and grassland types had larger home ranges (7.6 km²) than those that inhabited forested habitats (2.1 km²). Douglas fir, big sagebrush, and swale cover types received, respectively, 47%, 21%, and 14% of the total summer-fall habitat use. Total population estimates of 2,105 and 2,010 were calculated for early and late winter 1979-80, respectively. Adult females, fawns, and adult males comprised 61%, 43%, and 4%, respectively, of the early winter population. Fawn production was 1.56 and 1.64 per radio-collared doe for 1979 and 1980, respectively. Overwinter mortality was low for the 1979-80 winter. Fawn:adult ratios decreased from 76 to 65 fawns/100 adults from early to late winter, representing an estimated loss of only 140 fawns. A minimum of 33 deer in 1979 and 66 in 1980 were killed during the fall hunting seasons. The Brackett Creek mule deer population may be stabilized at about 2,000-2,300 deer without apparent winter range browse deterioration or excessive hunting mortality, and despite high fawn production and survival.

INTRODUCTION

Mule deer in the Bridger Mountains, Montana are distributed in relation to 7 major winter ranges located around the periphery of the mountains (Mackie et al. 1978). The deer using each winter range appear to comprise discrete populations that occupy fairly distinct and definable yearlong herd ranges located around and within 8 to 16 km of the winter ranges (Mackie and Pac 1980). Previous studies have indicated that each population has a different habitat use pattern and strategy within its range. Population dynamics also vary between ranges. These differences seem to reflect the responses of deer to the entire environmental complex of their particular herd range (Mackie et al. 1980). Individual herd ranges differ in topographical, physiological, vegetational, climatic, and land use characteristics as detailed by Mackie et al. (1980).

During the winter of 1977-78, studies were initiated to define and characterize the population and habitat of the mule deer associated with the Brackett Creek winter range and to compare results with data for other populations and habitats in the Bridger Mountains. Seasonal distributions, movements, habitat use, food habits, and population characteristics were generally defined by Nyberg (1980). My study was designed to obtain more specific information on the vegetational and forage characteristics of the Brackett Creek winter range and additional data on population characteristics. Deer-habitat interactions

were measured in terms of observed movements and distribution of deer in relation to habitat/environmental features, including topography, vegetation, climate, land use practices, and public access within the Brackett Creek herd range. Comparisons between those data and data obtained from the Armstrong (Bucsis 1974) and Schafer Creek (Steerey 1979) winter ranges on the west slope of the Bridger Mountains portrayed differences in strategy of the deer populations using each range.

Field studies were conducted full time during summer and winter and intermittently during other seasons from June 1979 through December 1980.

DESCRIPTION OF THE STUDY AREA

The Brackett Creek Study Area was located in the east-central portion of the Bridger Mountain Range in Gallatin and Park Counties, Montana (Fig. 1). Nyberg (1980) described the area as including the north end of Bangtail Ridge and its easterly foothills draining into the Shields River. During this study, the northern boundary was extended to encompass the southwest portion of Battle Ridge, including the entire drainages of Horse Creek, Nixon Creek, and Fox Creek, which flow southeasterly into Brackett Creek.

The entire area (Fig. 2) comprised about 34,750 ha. This was 3,250 ha more than recognized by Nyberg (1980). Approximately 7,459 ha (21.5%) of the total were included within the Brackett Creek mule deer winter range. Most of the area (84%), including all of the winter range, was privately owned. Public lands administered by the Gallatin National Forest comprised approximately 5,441 ha (16% of the total) distributed in a checkerboard pattern at elevations above about 1,800 m.

The forest cover of the higher elevations of the Bangtail Ridge was generally Douglas fir (*Pseudotsuga menziesii*) with smaller areas of lodgepole pine (*Pinus contorta*) and subalpine fir (*Abies lasiocarpa*). Plant names follow Hitchcock and Cronquist (1973). Forested areas of Battle Ridge included in the study area were comprised primarily of Douglas fir. The foothills of Bangtail Ridge were characterized by

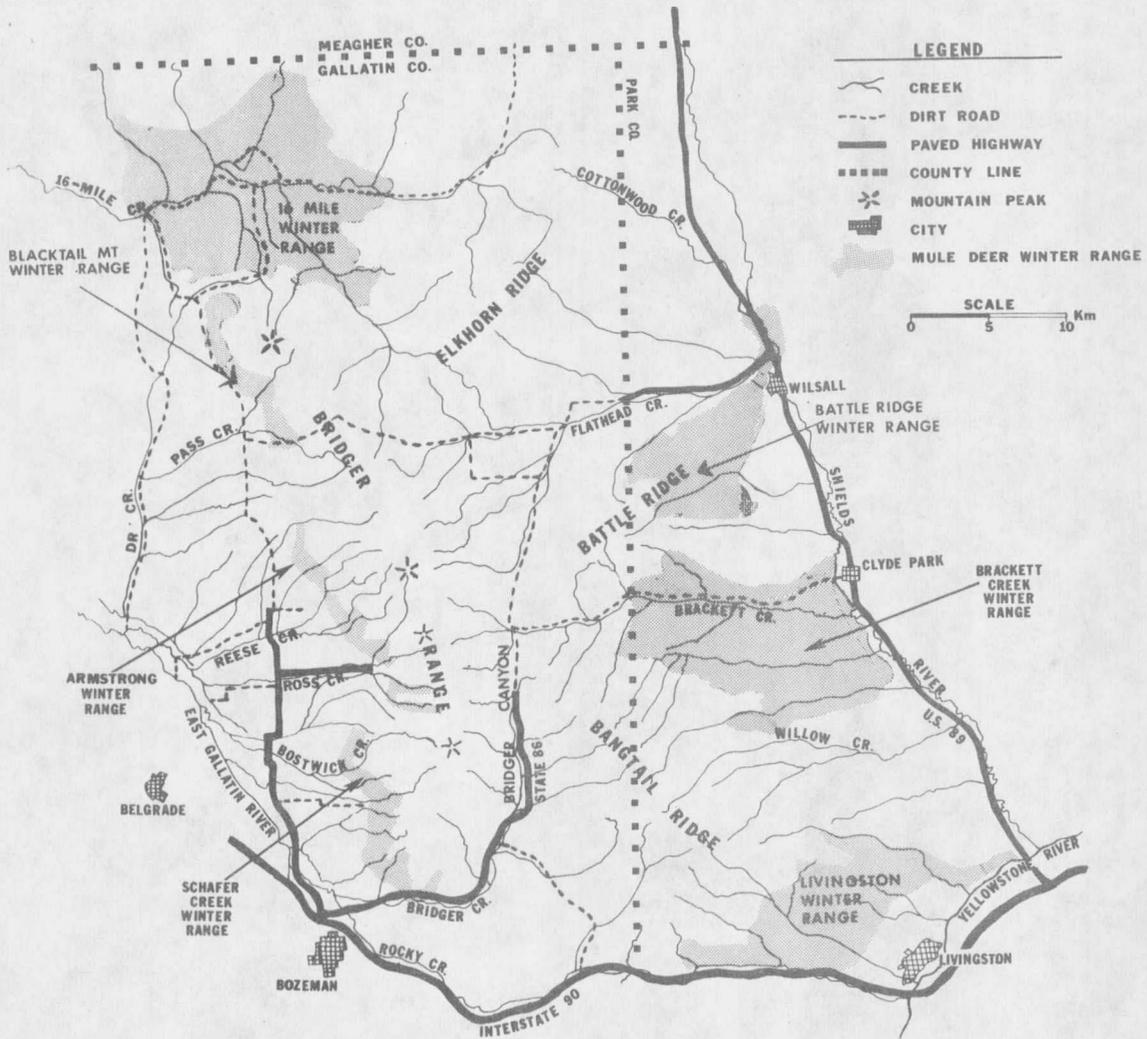


Figure 1. Map of the Bridger Range showing major features and the location of the Brackett Creek and other mule deer winter ranges.

